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136
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Effect Of Cultivar, Time Of Sowing And Fungicide Application On Seed Yield Of Cocksfoot (*Dactylis glomerata* L)

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ABSTRACT

Three New Zealand (Grasslands Wana, Grasslands Kara, Grasslands Tekapo) and two Japanese (Akimidori, Makibamidori) cocksfoot cultivars were sown in spring (23 September 1991) and again the following autumn (6 April 1992) at AgResearch Grassland's Aorangi Research Farm in the Manawatu. Seed was sown at 3 kg/ha with a 30 cm row spacing. Plot size was 1.2 x 3.0 m², with each plot containing 4 rows. A randomised block design was utilised with 8 replicates of each cultivar for each sowing time. For each cultivar and sowing time four of the eight replicates were sprayed with propiconazole (125 g a.i./ha) on 17 November 1992 and 8 December 1992. Spring sowings outyielded autumn sowings by 150 to 482 kg/ha depending on cultivar. The ability of the spring sown cultivars to outproduce autumn sown cultivars was due largely to their ability to produce a greater number of fertile tillers. Autumn sown cultivars failed to produce a large number of fertile tillers which lead to a reduced potential seed yield. This was further exasperated by the fact that the floret site utilisation (FSU) of the autumn sown cultivars was lower than that of the spring sown cultivars. Cultivar Wana was the only cultivar able to produce a reasonable number of fertile tillers following autumn sowing. It was also able to double the number of florets/tiller compared to that of spring sown cv Wana, thus allowing it to produce a reasonable seed yield. Cultivar Wana produced 557 kg seed/ha from the autumn sowing, and cv. Tekapo 244 kg seed/ha, but yields for the other three cultivars were less than 100 kg/ha following autumn sowing. Spring sowing produced pure seed yields of 707, 566, 593, 383 and 307 kg/ha for cv. Wana, Tekapo, Kara, Akimidori and Makibamidori respectively. Apart from cv Wana, fungicide application to autumn sown plots did not significantly increase seed yield, and similarly no differences were recorded for spring sown cv Akimidori and Makibamidori.

However fungicide application significantly increased seed yield in cv Wana, Kara and Tekapo, the increases being 521 (+ 74%), 119 (+ 21%) and 564 (+ 95%) kg/ha respectively, even though the incidences of fungal pathogens was less than 1%. These seed yield increases were due to an increase in the green area of the leaves and stem. In cv Wana and Tekapo there was also a significant increase in FSU due to the application of fungicide.

Following harvest stubble was removed and the area retained for another year and subsequent harvest. As the effects of time of sowing were considered no longer significant, the trial was run as one block of 80 plots, thus giving 16 replicates of each cultivar. For each cultivar, four replicates received one of four different fungicide (188 g ai/ha of terbuconazole) treatments; a nil application, one application at approximately 10% ear emergence, one application at approximately 10% ear emergence followed by another at early anthesis and one application at early anthesis followed by one post anthesis (10 days after full anthesis).

In the absence of fungicide pure seed yields produced were 1133, 1208, 915, 556 and 671 kg/ha for cv. Wana, Kara, Tekapo, Makibamidori and Akimidori respectively. Although once again the incidence of fungal pathogens was less than 1%, fungicide increased the seed yield of all cultivars. The best results came from two applications of fungicide, one at ear emergence and one at anthesis. The exception to this was for cv Tekapo which gained the greatest increase from one application at ear emergence. These treatments increased the pure seed yield by 29%, 15%, 23%, 43% and 19% for cv Wana, Kara, Tekapo, Makibamidori and Akimidori respectively. Different cultivars reacted differently to the application of fungicide, with fungicide significantly increasing the thousand seed

weight of cv Kara, Tekapo, Akimidori and Makibamidori, although it had no such effect on cv Wana. Fungicide application increased the FSU of cv Wana and Tekapo but did not significantly affect cv Akimidori, Makibamidori and Kara. Cultivars Wana and Makibamidori showed a significant association between green area and seed yield, but these relationships were not significant for the other three cultivars. There was a significant association between FSU and seed yield after fungicide application for all the cultivars except cv Kara. The most cost effect return for the application of fungicide was that of a single application at ear emergence.

Keywords: Cocksfoot, *Dactylis glomerata*, rust, eyespot, propiconazole, terbuconazole, fungicide, sowing date, cultivar.

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TABLE OF CONTENTS

ABSTRACT.....	i
ACKNOWLEDGEMENTS.....	iv
LIST OF TABLES	iii
LIST OF FIGURES.....	v
CHAPTER 1.....	1
INTRODUCTION.....	1
LITERATURE REVIEW.....	3
Growth and Reproductive Development	3
Effects of Time of Sowing and Sowing Rate	11
Effect of Diseases on Cocksfoot Seed Yield	13
Cultivars used in this Trial	18
CHAPTER 2.....	20
INTRODUCTION.....	20
MATERIALS AND METHODS	20
RESULTS.....	29
Vegetative Tiller Production.....	29
Reproductive Tillers.....	32
Green Area.....	35
Seed Yield Components.....	36
Field Dressed Seed Yield	40
Machine Dressed Seed Yield	41
Cleaning Losses and Percentage Pure Seed	43
Multiple Seed Units.....	44
Pure Seed Yield.....	45
Seed Quality	46
DISCUSSION	49
Effect of Time of Sowing.....	49
Effect of Cultivar	53
Effect of Fungicide Application	57

CHAPTER 3.....	61
INTRODUCTION	61
MATERIALS AND METHODS	61
RESULTS.....	66
Reproductive Tillers.....	66
Green Area	66
Seed Yield Components.....	68
Field Dressed Seed Yield.....	71
Machine Dressed Seed Yield	72
Cleaning Losses and Percentage Pure Seed	74
Pure Seed Yield.....	75
Seed Quality	75
DISCUSSION	77
Effect of Cultivar	77
Effect of Fungicide.....	80
CHAPTER 4.....	85
CONCLUSION	85
BIBLIOGRAPHY	90
APPENDICES	97
Appendix 1. Germination results from 1993 season from samples of cv Wana and Kara from MAF Seed Testing Station.	97
Appendix 2. Regression values (R^2) for tillers/m ² , thousand seed weight, florets/tiller and floret site utilisation against pure seed yield in five spring sown cocksfoot cultivars.	97
Appendix 3. Regression values (R^2) for green area against seed yield in five spring sown cocksfoot cultivars.	98
Appendix 4. Regression values (R^2) for green area against floret site utilisation in five spring sown cocksfoot cultivars.	98
Appendix 5. Meteorological data 1992, Aorangi Lowland Research Station.....	99
Appendix 6.1 Frequencies at which different percentages of multiple seed units occur in different seedlots.	100
Appendix 6.2 Frequencies at which different percentages of multiple seed units occur in different seedlots.	101
Appendix 7. Regression values (R^2) for seed yield components against seed yield in five cocksfoot cultivars.	102
Appendix 8. Regression values (R^2) for green area against seed yield in five cocksfoot cultivars. .	102
Appendix 9. Regression values (R^2) for green area against floret site utilisation in five cocksfoot cultivars.	103
Appendix 10. Meteorological Data 1993, Aorangi Lowland Research Station.....	103

LIST OF TABLES

Table 1.	Developmental processes determining potential and actual yield components of perennial ryegrass seed crops.....	5
Table 2.	Harvest dates.....	24
Table 3.	Effect of cultivar and fungicide treatment on percentage Green Area in spring sown cocksfoot.	36
Table 4.	Effect of cultivar and fungicide treatment on percentage Green Area of autumn sown cocksfoot.	37
Table 5.	Effect of cultivar and fungicide treatment on yield components and floret site utilisation of spring sown cocksfoot.	38
Table 6.	Effect of cultivar and fungicide treatment on yield components and floret site utilisation of autumn sown cocksfoot.	39
Table 7.	Effect of cultivar and fungicide treatment on field and machine dressed seed yield, cleaning losses, purity and mutiple seed units of spring sown cocksfoot.	40
Table 8.	Effect of cultivar and fungicide treatment on field and machine dressed seed yield, cleaning losses, purity and multiple seed units of autumn sown cocksfoot.	42
Table 9.	Effect of time of sowing and fungicide application on pure seed yield (kg/ha) of five cocksfoot cultivars.....	46
Table 10.	Effect of fungicide treatment and cultivar on the germination of seed from spring sown plots.....	47
Table 11.	Effect of fungicide treatment and cultivar on the germination of seed from autumn sown plots.	48
Table 12.	Dates on which fungicide was applied during ear emergence, anthesis and post anthesis in 1993.....	64
Table 13.	Harvest dates.....	65
Table 14.	Effect of cultivar and fungicide treatment on percentage Green Area	68
Table 15.	Effect of cultivar and fungicide treatment on yield components and FSU.	71

Table 16.	Effect of cultivar and fungicide treatment on field and machine dressed seed yield, cleaning losses, purity and pure seed yield.	72
Table 17.	Effect of fungicide treatment and cultivar on the germination of seed.....	75

LIST OF FIGURES

Figure 1.	Experimental design - plot plan.....	21
Figure 2.	Germination test.....	28
Figure 3.	Vegetative Tiller Numbers Following Spring Sowing.....	30
Figure 4.	Vegetative Tiller Numbers Following Autumn Sowing.....	31
Figure 5.	Estimated Rate of Head Emergence Following Spring Sowing.....	33
Figure 6.	Estimated Rate of Head Emergence Following Autumn Sowing.....	34
Figure 7.	Experimental design - plot plan.....	62
Figure 8.	Estimated Rate of Head Emergence.....	67